

# Work Order ID 79013

May-30-12 8:01:40 AM

**\*79013\***

Page 1

Item ID: D350-748-141TRN

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID: ~~U/R~~

Stop **\*NS2\***

Item Name: Crosstube Turning Detail

Start Date: 1/18/12 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 1/20/12 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan:  Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D350-748-141	F U/R OK 6/12/12

100

0.00

**\*100\***

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs on both ends as per Folio FA648  
2-Turn first side as per Folio FA648  
3- File transition lines smooth.  
FOLIO REV: \_\_\_\_\_  
DWG REV: F

12-2-1  
maml

110

QC1- Inspect dimensions to dimension sheet

0.00

**\*110\***

QC

Memo

0.00

Quality Control

12-2-1  
maml

**Work Order ID 79013****\*79013\***

Page 2

May-30-12 8:01:40 AM

Item ID: D350-748-141TRN

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID: U/R

Stop **\*NS2\***

Item Name: Crosstube Turning Detail

Start Date: 1/18/12 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 1/20/12 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Run Start **\*NR1\***

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

120

**\*120\***

Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

1-Turn second side as per Folio FA648  
2- File transition lines smooth.  
3-Scribe Part & Batch as per Dwg D350-748-141  
FOLIO REV: \_\_\_\_\_  
DWG REV: \_\_\_\_\_

0.00

0.00

12-2-1  
mmml

130

**\*130\***

QC

Quality Control

QC1- Inspect dimensions to dimension sheet

Memo

0.00

0.00

12-2-1  
mmml

140

**\*140\***

QC

Quality Control

QC8- Inspect parts - second check

Memo

0.00

0.00



12-2-7

**\*79013\***

May-30-12 8:01:40 AM

**Accept**

**\*N900040100\***

Setup Start \*NS1\*

Stop \*NS2\*

**Item Name:** Crosstube Turning Detail

**Start Date:** 1/18/12      **Start Qty:** 1.00      **\*1\***

**Cust Item ID:**

**Required Date:** 1/20/12      **Req'd Qty:** 1.00      **\*1\***

**Customer:**

**Reference:**

**Approvals:** \_\_\_\_\_ **Process Plan:** \_\_\_\_\_ **Date:** \_\_\_\_\_ **Tooling:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Run Start \*NR1\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

150

0.00

**\*150\***

## Large Fab

0.00

## Crosstubes

## Memo

## Crosstubes

Grind machining marks

160

Outsource process - Heat Treat

0.00

**\*160\***

## Outsource1

## Memo

0.00

Outsource process - Heat Treat

Issue P/O: 16600  
Heat Treat to min 180 KSI As per Dwg D350-748-141  
(MIL-T-6736 OR AMS 2759-1C)  
Sand Blast tube after Heat Treat  
Possible Supplier: Vac Aero  
Ensure Certificate of Conformity is attached

170

Receive & Inspect for Damage & Mat'l Certs	0.00
--	------

**\*170\***

### Packaging

## Memo

0.00

## Packaging

Ensure certificate of conformaty is attached

W/O: 79013

## WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
12.03.26	151	DRILL Ø0.188 TOOLING HOLE THRU CUFF, (Qty(1) PER CUFF, 2" FROM END. TOOLING HOLES IN EACH CUFF MUST BE PARALLEL TO EACH OTHER. SEE ATTACHED DWG		mo 12-3-26		CP 12.03.26 CB/1042	

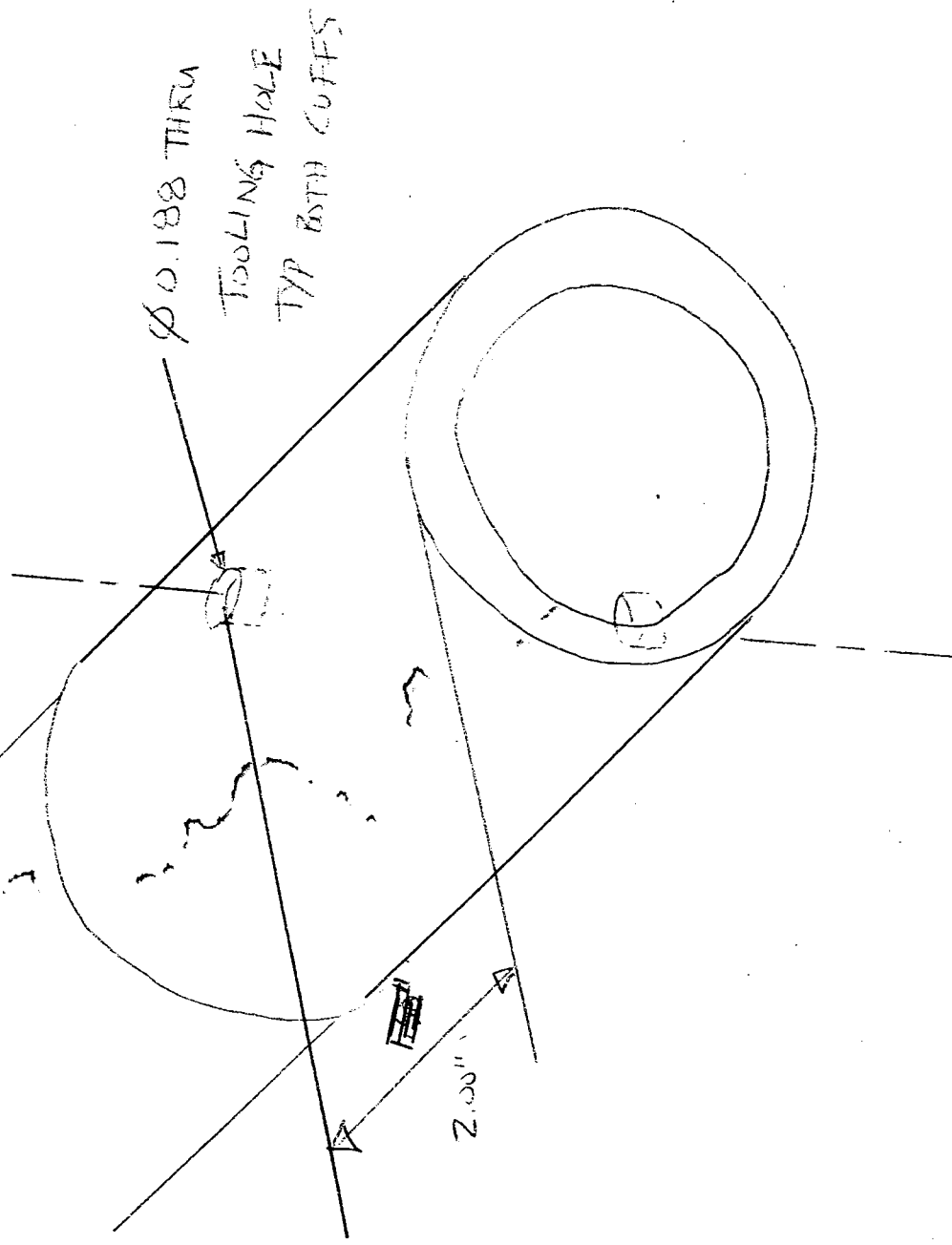
Part No: D350-748-141 TRN PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date &amp; initial all entries

Q 12.03.19





# Work Order ID 79013

**\*79013\***

Page 4

January-18-12 1:52:38 PM

Item ID: D350-748-141TRN

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID: U/R

Stop **\*NS2\***

Item Name: Crosstube Turning Detail

Start Date: 18/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/01/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	QC6- Inspect dimensions to drawing	0.00							
<b>*180*</b>									
QC	Memo	0.00							
Quality Control									
190		0.00							
<b>*190*</b>	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and stock in kanban rack Location: _____								
200	QC21- Final Inspection - Work Order Release	0.00							
<b>*200*</b>									
QC	Memo	0.00							
Quality Control									

PP 84380/S

12/6/25  
me  
12-06-25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# Picklist Print

January-18-12 1:52:42 PM

Page 1

Work Order ID: 79013

\*79013\*

Parent Item: D350-748-141TRN

\*D350-748-141TRN\*

Parent Item Name: Crosstube Turning Detail

Start Date: 18/01/2012

Required Date: 20/01/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec  
IPP Rev B Removed polish 08.04.02 EC verified by : DD  
IPP Rev C Remove LPS-3 08.06.23 EC verified by DD IPP Rev C  
11.02.24 as per dwg rev.F DD verf: JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6015-125		Manufactured	No			110	Each	72.0000	1	1			

\*D6015-125\*

Crosstube Material

\*\*

Location

Loc Qty

Loc Code

HALL

72

61380

12

72311

60

7 mml 12/01/31

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
2/10/08	J.P.M.							

NOTE: Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b> 79013
<b>Description:</b> Crosstube Assembly (AS350/355 High Fwd)		<b>Part Number:</b> D350-748-141
<b>Inspection Dwg:</b> D350-748-141 Rev: F		<b>Page 1 of 1</b>

### FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.245	✓		vern	CNC-05
	2.180	+0.005/-0.000	2.185	✓			
	2.180	+0.005/-0.000	2.184	✓			
	2.237	+0.005/-0.000	2.240	✓			
	2.272	+0.005/-0.000	2.273	✓			
	2.306	+0.005/-0.000	2.307	✓			
	2.339	+0.007/-0.000	2.244	✓			
	2.339	+0.007/-0.000	2.343	✓			
	0.062	+/-0.010	.062	✓		vern	CNC-05
	4.26	+/-0.030	4.26	✓		"	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		"	
	2.240	+0.005/-0.000	2.245	✓		vern	CNC-04
	2.180	+0.005/-0.000	2.184	✓			
SIDE B	2.180	+0.005/-0.000	2.184	✓			
	2.237	+0.005/-0.000	2.240	✓			
	2.272	+0.005/-0.000	2.274	✓			
	2.306	+0.005/-0.000	2.306	✓			
	2.339	+0.007/-0.000	2.344	✓			
	2.339	+0.007/-0.000	2.344	✓			
	0.062	+/-0.010	.062	✓		vern	CNC-08
	4.26	+/-0.030	4.26	✓		"	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		"	
	110.27	+/-0.060	110.27	✓		tape	mm-L-02

<b>Measured by:</b> JMM	<b>Audited by:</b> DP	<b>Preliminary Approval:</b>
<b>Date:</b> 12/01/31	<b>Date:</b> 12-2-7	<b>Date:</b>

Rev	Date	Change	Revised by	Approved
A	06.11.09	New Issue (P/C D350-748-101)	KJ/JLM	
B	07.10.24	Dwg Rev updated	KJ/EC/DD	
C	11.01.20	Dwg Rev updated	KJ	
D	11.07.26	Tolerance revised for 2.339 dimensions	KJ	

110

110

110

110

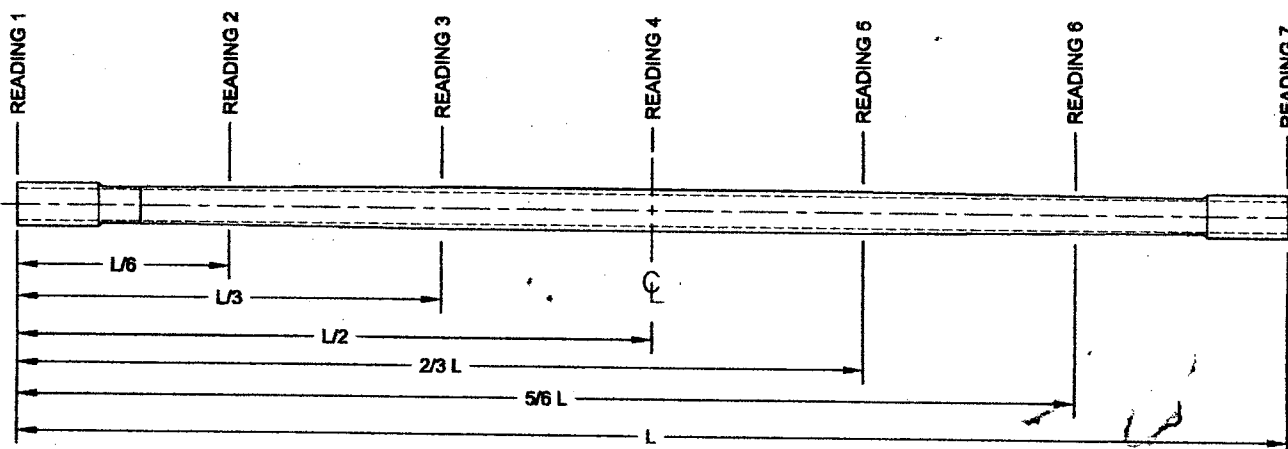
110

110

110

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b> 79013
<b>Description:</b>		<b>Part Number:</b> 350-748-011
<b>Inspection Dwg:</b>		<b>Page 1 of 1</b>

### WALL THICKNESS MEASUREMENT



	WALL THICKNESS MEASUREMENT (IN)				DEVIATION (max-min)	TOLERANCE
	Q1	Q2	Q3	Q4		
READING 1 L= 0"						0.030"
READING 2 L= 18"	.119	.125	.142	.151		
READING 3 L= 37"	.165	.162	.179	.186		
READING 4 L=						
READING 5 L= 18"	.136	.142	.135	.137		
READING 6 L= 37"	.164	.172	.182	.186		
READING 7 L=						

15.

16.

17.

18.

19.



2000  
2001

Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6015-125	CROSSTUBE (OR D6017-115)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

#### GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6017-115  
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2  
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF  
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.  
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER

NO. 79013 M.C.J  
12/01/18

UNDER REVIEW

11.07.12

RELEASED  
2011-01-18

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C8-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	10.11.23		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D350-748-141	REV. F SHEET 1 OF 4
TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

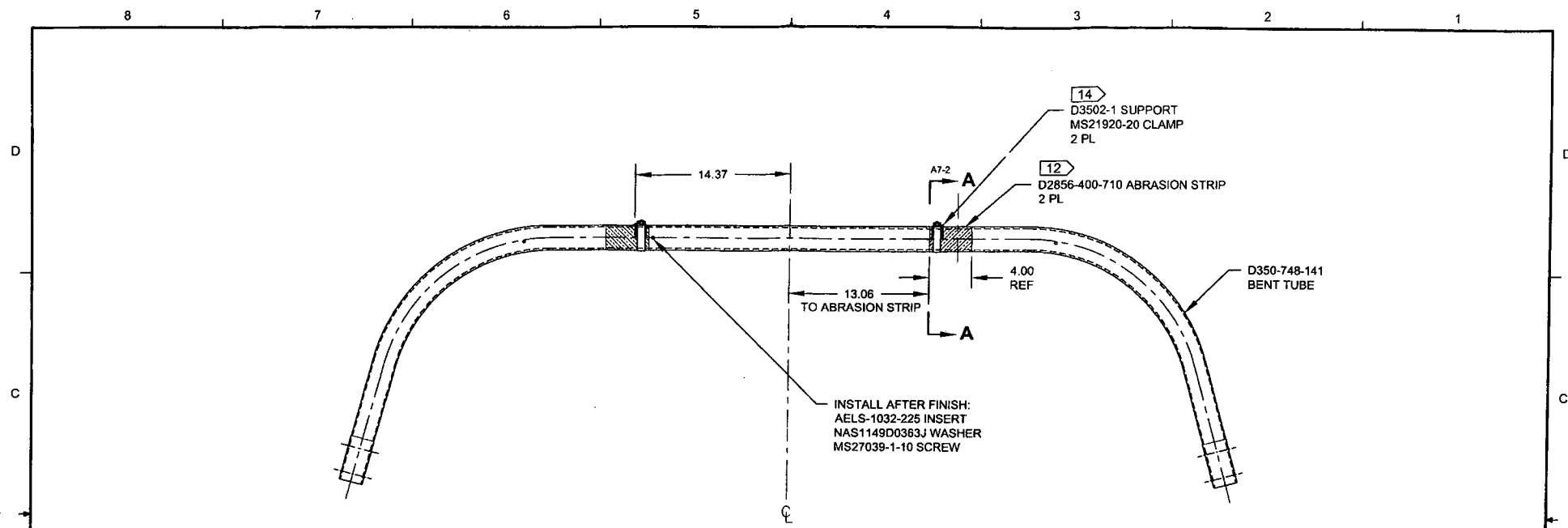
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

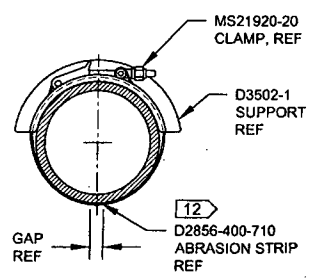
**NOTE:** Date & initial all entries



79013



**D350-748-141  
ASSEMBLY DETAIL**



UNDER REVIEW  
11.07.11

RELEASED  
2011-01-18

DESIGN		<b>DART AEROSPACE LTD</b>	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. F
MFG. APPR.		D350-748-141	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	<small>COPYRIGHT © 2008 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIES OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

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DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Technical drawing of a bent pipe assembly. The drawing shows a pipe with a bend, with dimensions and callouts indicating specific features and tolerances.

**Dimensions:**

- Overall length: 82.68 ± 0.25
- Horizontal distance from centerline to end of bend: 40.90 ± 0.13
- Horizontal distance from centerline to end of pipe: 41.34 ± 0.13
- Vertical distance from centerline to end of bend: 24.87 ± 0.13
- Vertical distance from centerline to end of pipe: 23.25 ± 0.13
- Horizontal distance from bend start to end of bend: 22.4 REF (569mm)
- Horizontal distance from bend start to end of pipe: 24.81
- Horizontal distance from bend start to end of pipe: 12.69
- Horizontal distance from bend start to end of pipe: 22.4 REF (569mm)
- Horizontal distance from bend start to end of pipe: 24.81
- Horizontal distance from bend start to end of pipe: 12.69

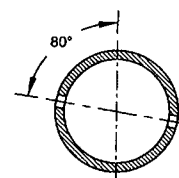
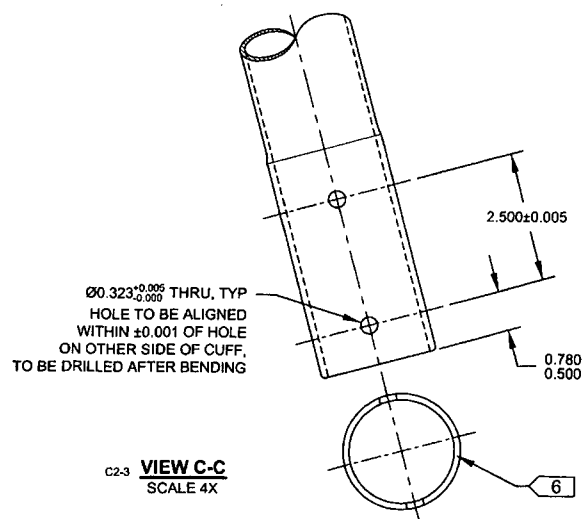
**Callouts and Features:**

- Ø0.244 THRU
- R16.0 ± 1.0
- 75° ± 2°
- 11.8 REF (299mm)
- Ø0.297 THIS SIDE ONLY, THRU ONE WALL ONLY
- D350-748-141TRN
- A4-3
- B
- C
- A8-3
- CUFF, FS SHOWN TWISTED REF
- CUFF, NS REF
- 0.25 MAX TWIST AFTER BENDING (NOT SHOWN TO SCALE)

**Notes:**

- 8
- 15
- F

**D350-748-141**  
**BENDING AND DRILLING DETAIL** 10



**UNDER REVIEW**

RELEASE  
2011-01-18

DESIGN	92	<b>DART AEROSPACE LTD</b>	
DRAWN	92	<b>HAWKESBURY, ONTARIO, CANADA</b>	
CHECKED	13	DRAWING NO.	REV. 1
MFG. APPR.	13	D350-748-141	SHEET 3 OF 4
APPROVED	14	TITLE	SCALE
DE APPR.	14	CROSSTUBE (AS 350/355 HI FWD)	NT
DATE	10.11.23	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESS COVENANT THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED IN ANY MANNER OR BY ANY OTHER PERSON WITHOUT THE WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

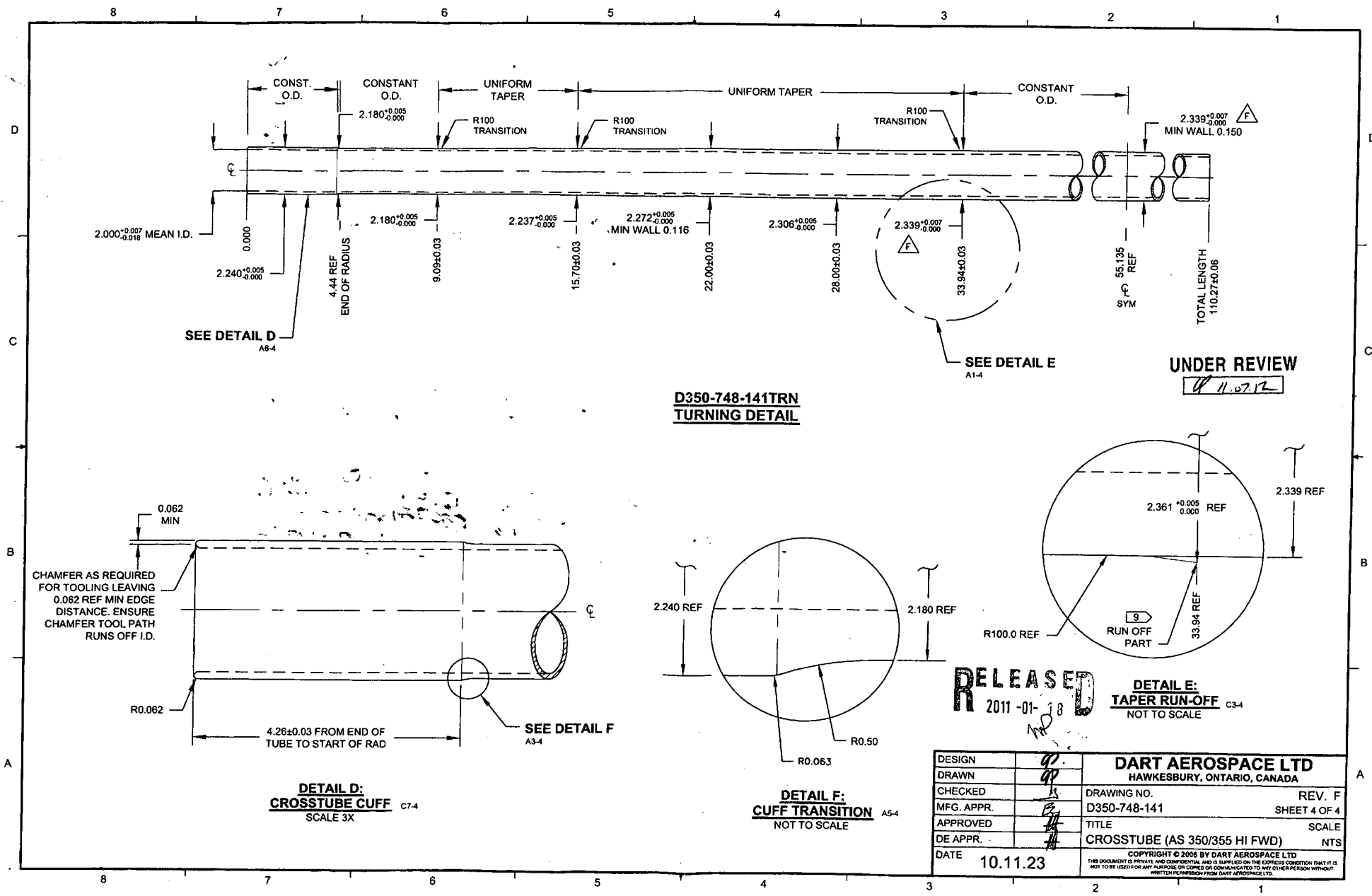
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

79013



UNDER REVIEW  
11.07.12

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

**METLAB**  
**1000 E. MERMAID LANE**  
**WYNDMOOR, PA 19038**

**Packing List**  
Sales Order Number

71  
Sales Order Date  
Apr 3, 2011  
Page

Voice: 215-233-2600  
Fax: 215-233-5633

Sold To:  
DART AEROSPACE  
1270 ABERDEEN STREET  
HAWKESBURY, ON K6A 1K7

Ship To:  
DART AEROSPACE  
1270 ABERDEEN STREET  
HAWKESBURY, ON K6A 1K7

Customer ID	PO Number	Payment Terms
DARA	PO16600	Net 30 Days
	Ship Via	Process
	YRC	

Quantity	Item	Description	Total Shipped	This Shipme
1.00	✓	1 PC. 74672 D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC)		
1.00	✓	1 PC. 74673 D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC)		
1.00	✓	1 PC. 74676 D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC)		
1.00	✓	1 PC. 74678 D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC)		

COMMENTS

SHIPPED BY SIGNATURE  
METLAB

DATE

RECEIVED BY SIGNATURE  
DART AEROSPACE

DATE

**Packing L**

Sales Order Num

71

Sales Order I

Apr 3, 2

F

**METLAB****1000 E. MERMAID LANE****WYNDMOOR, PA 19038**

Voice: 215-233-2600

Fax: 215-233-5653

Sold To:

DART AEROSPACE  
1270 ABERDEEN STREET  
HAWKESBURY, ON K6A 1K7

Ship To:

DART AEROSPACE  
1270 ABERDEEN STREET  
HAWKESBURY, ON K6A 1K7

Customer ID	PO Number	Payment Terms
DARA	PO16600	Net 30 Days
Ship Via	Process	
YRC		

Quantity	Item	Description	Total Shipped	This Shipm
1.00	✓	D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC) 1 PC. 74712		
1.00	✓	D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC) 1 PC. 74718		
1.00	✓	D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC) 1 PC. 79010		
		D-350-748-141TRN CROSSTUBE		

COMMENTS

SHIPPED BY, SIGNATURE  
METLAB5/1/12  
DATERECEIVED BY, SIGNATURE  
DART AEROSPACE

DATE



**Packing L**

Sales Order Nur

Sales Order I

Apr 3, 2

F

**METLAB****1000 E. MERMAID LANE****WYNDMOOR, PA 19038**

Voice: 215-233-2600

Fax: 215-233-5653

Sold To:

DART AEROSPACE  
1270 ABERDEEN STREET  
HAWKESBURY, ON K6A 1K7

Ship To:

DART AEROSPACE  
1270 ABERDEEN STREET  
HAWKESBURY, ON K6A 1K7

Customer ID	PO Number	Payment Terms
DARA	PO16600	Net 30 Days
Ship Via	Process	
YRC		

Quantity	Item	Description	Total Shipped	This Shipm
1.00	✓	HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC) 1 PC. 79011 D-350-748-141TRN CROSSTUBE		
1.00	✓	HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC) 1 PC. 79013 D-350-748-141TRN CROSSTUBE		
1.00	✓	HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC) 1 PC. 73372 D-350-748-141TRN CROSSTUBE		
		HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC)		

COMMENTS

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METLAB5/1/12  
DATERECEIVED BY, SIGNATURE  
DART AEROSPACE

DATE

**METLAB**  
**1000 E. MERMAID LANE**  
**WYNDMOOR, PA 19038**

**Packing L**

Sales Order Num

71

Sales Order I

Apr 3, 2

F

Voice: 215-233-2600  
Fax: 215-233-5653

Sold To:  
DART AEROSPACE  
1270 ABERDEEN STREET  
HAWKESBURY, ON K6A 1K7

Ship To:  
DART AEROSPACE  
1270 ABERDEEN STREET  
HAWKESBURY, ON K6A 1K7

Customer ID	PO Number	Payment Terms
DARA	PO16600	Net 30 Days
	Ship Via	Process
	YRC	

Quantity	Item	Description	Total Shipped	This Shipment
1.00	✓	1 PC. 73375 D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC)		
1.00	✓	1 PC. 79391 D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC)		
1.00	✓	1 PC. 79392 D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC)		
1.00	✓	1 PC. 79393 D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC)		

COMMENTS

SHIPPED BY, SIGNATURE  
METLAB

DATE

RECEIVED BY, SIGNATURE  
DART AEROSPACE

DATE



**Packing L**

Sales Order Nur

71

Sales Order I

Apr 3, 2

F

**METLAB****1000 E. MERMAID LANE****WYNDMOOR, PA 19038**

Voice: 215-233-2600

Fax: 215-233-5653

Sold To:

DART AEROSPACE

1270 ABERDEEN STREET

HAWKESBURY, ON K6A 1K7

Ship To:

DART AEROSPACE

1270 ABERDEEN STREET

HAWKESBURY, ON K6A 1K7

Customer ID	PO Number	Payment Terms
DARA	PO16600	Net 30 Days
Ship Via	Process	
YRC		

Quantity	Item	Description	Total Shipped	This Shipm
		D-350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI (MIL-T-6736OR AMS 2759-IC) 560 POUNDS TOTAL		

COMMENTS

SHIPPED BY, SIGNATURE  
METLAB5/1/12  
DATERECEIVED BY, SIGNATURE  
DART AEROSPACE

DATE





1000 E. Mermaid La., Wyndmoor (Phila.) PA 19038-8093  
Tel. (215) 233-2600 Fax (215) 233-5653

## Certification

### SOLD TO

Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7

May 1, 2012

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<b>Metlab Shop Order No:</b>	71785
<b>Purchase Order:</b>	16600
<b>Description:</b>	Crosstube
<b>Part No.:</b>	D350-748-141TRN
<b>Quantity:</b>	14 Pieces
<b>Weight:</b>	560 Pounds
<b>Material:</b>	4130 Alloy Steel
<b>Specifications:</b>	Heat Treat to Minimum 180 KSI (MIL-T-6736OR AMS 2759-IC)

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This is to certify that the above parts were processed as indicated above and conform to the specification requirements.

### Results:

8/21/07

HRC 40 (182 KSI Tensile Strength)

METLAB  
Quality Representative Mark Podob

MERCURY CONTAMINATION: During the heat treating process, testing and inspections, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing device.



Heat Treating and Metallurgical Consulting



## D350 X-TUBE CUFF MEASUREMENTS

TYPE	BATCH #	SIDE A	SIDE B
		TWO READINGS	TWO READINGS
AFT	B79393	2.221"/2.251"	2.227"/2.252"
AFT	B79391	2.251"/2.241"	2.236"/2.252"
AFT	B79392	2.238"/2.248"	2.220"/2.262"
AFT	B73372	2.243"/2.247"	2.223"/2.263"
AFT	B73375	2.245"/2.250"	2.236"/2.266"
FWD	B79010	2.230"/2.252"	2.235"/2.245"
FWD	B79011	2.200"/2.280"	2.248"/2.249"
FWD	B74718	2.208"/2.289"	2.242"/2.252"
FWD	B74673	2.189"/2.298"	2.247"/2.238"
FWD	B74678	2.240"/2.258"	2.262"/2.236"
FWD	B74672	2.253"/2.266"	2.260"/2.253"
FWD	B74712	2.264"/2.251"	2.255"/2.258"
FWD	B74676	2.229"/2.263"	2.239"/2.254"
FWD	B79013	2.249"/2.2236"	2.243"/2.245"

Notes: tubes are NOT sandblasted and are still a little crooked

~~REFERENCE ONLY~~  
8/10/2007



SECRET